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(54) Method and system for updating directory entries within electronic communication devices by accessing an electronic database

(57) A system and method are presented for electronically updating an existing directory entry within a directory of an electronic communication device by accessing a database. Electronic communication devices may include, but are not limited to telephones, facsimile machines or electronic organizers. Information within directory entries may be referred to as entry content values. Entry content values may be subdivided into individual portions. The system and method as described herein allows these portions to be updated without altering the rest of the entry content value. For example, a telephone number consists of three portions; an area code, an exchange code, and an individual-assignment code. When an area code changes for a particular geographic region, only the area code of the telephone numbers in that region change, not the other portions of the telephone numbers. Therefore, it is only necessary to update the area codes for the affected telephone numbers. An electronic database may be created, listing the old and new area code along with the affected exchange codes. An electronic communications device may then access or download the database to update the portions of the entry content values corresponding to the affected directory entries. Alternatively, similar information may be transmitted to the electronic communications device by a second communications device. The database may be supplied by a telephone service provider or by an entity other than a telephone service provider. Preferably, the database may be downloaded to the electronic communication device so that no outside entities have access to the directory.

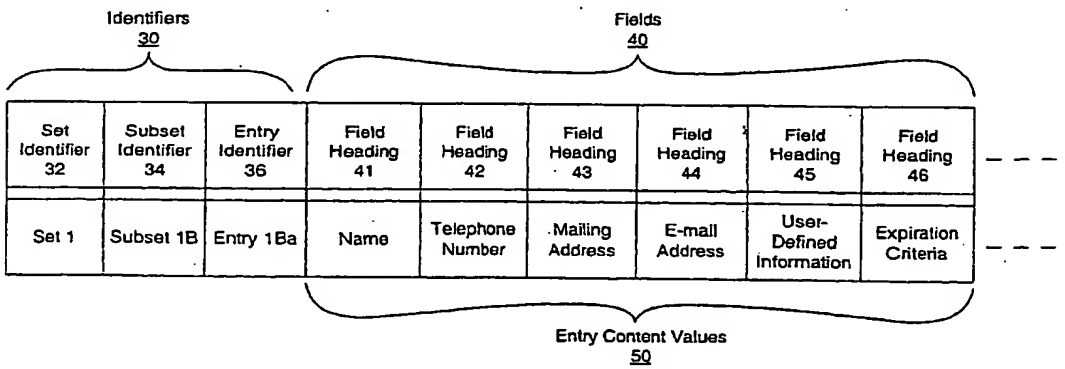

Figure 2

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which may be referred to herein as entities, need to be modified, while sometimes only portions of entities require modification. For example, when an area code has changed for a given set of telephone numbers within a geographical region, only the area code of the telephone number changes while the base number remains the same. However, current directory applications in telephones are unable to update portions of individual entities since the entities themselves are not structured in segments. This task of updating the entire entity is tedious and is often forgone due to time-consuming steps. This problem may lead to an accumulation of multiple entries for the same name, taking up valuable memory space or leaving the user with conflicting information. The programs of the current applications do not query the listing of directory entries to determine if the entry already exists, thus allowing the potential accumulation of equivalent entries.

[0009] In addition to the limitations as noted above, many current telephone directories do not offer an easy avenue of highlighting and removing unused entries. For example, entries of a client that a salesperson no longer calls upon may be overlooked and not deleted, thus taking up valuable memory space. Alternatively, the user may know in advance if an entry is not going to be used after a given period of time or can associate a plurality of entries with a certain identity, so that when the user no longer needs the entries, they can be deleted. Removing unused entries allows the user to organize and access directory entries faster. However, the user must currently remember which entries to remove and delete them manually. Since entry removal is a manual process, the benefit of better organization and easier access is sometimes sacrificed due to the time and effort required to maintain the directory.

[0010] It would therefore be desirable to develop an organizational and management system for telephone directories within electronic devices that address the aforementioned limitations. It would further be desirable to develop a system and method allowing communication with another device or database without the requirement of maintaining a line-of-sight path between the two entities, but rather by using the inherently built-in communication capability of the devices. The desired system and method should be simple to use and require minimal effort by the user.

SUMMARY OF THE INVENTION

[0011] The problems outlined above are in large part addressed by a system and method for organizing and managing directory entries within electronic communication devices. Electronic communication devices may include, but are not limited to telephones, facsimile machines or electronic organizers. As storage capacity of electronic devices increases and more devices are created that require telephone numbers for product use (i.e., telephones, facsimiles, pagers, etc.), there becomes a need to expand the complexity of organizational structures and directory management systems within directories of electronic communication devices. The most simplified directory management structure within electronic organizational devices is one that contains individual records, commonly called entries, without the categorization of multiple entries. More advanced structures organize entries into groups. An entry may comprise of a variety of information (i.e., a person's name, telephone number, address, etc.), which may be defined as entities. Often entries share a common entity or theme and may be placed in a category defined by that commonality, thus creating a more complex directory management structure. However, current electronic communication device applications limit the categorical management of directory entries to be of a single layer structure. As such, a category cannot have categories within itself, inhibiting the organization of a plurality of entries within an individual category. This simplified structure usually restricts the organization of the entries even further by requiring that all entries be classified into a category. Consequently, the user may place an entry into a category that does not fit into the commonality of the other entries within the category, making it more difficult to locate the entry at a later date. Another restriction often encountered in current electronic communication devices is only allowing an individual directory entry to be contained within one category. For example, a directory entry of a family member or co-worker may fit into multiple categories (i.e., family, work, softball team, etc.). With this single category limitation, the directory entry of the family member may only be located in one category, restricting the efficient use of the directory.

[0012] In a method described herein, directory within directories of electronic communication devices may be organized using sets and subsets in a hierarchical fashion. More specifically, a subset may include one or more entries and a set may include one or more subsets, thereby creating a multi-level organizational data structure. Furthermore, directory entries may be also located in sets and on the contrary, directory entries may not be located in sets or subsets at all. This organizational data structure of directory entries, subsets, and sets may then be applied to a directory management system as recited herein to simplify the accessibility and management of directory entries.

[0013] Each directory entry is defined by entry content values and identifiers, which are organized into fields. Entry content values, which characterize the information within the directory, may include names, telephone numbers, mailing addresses, or email-addresses. Furthermore, entry content values may include information such as expiration criteria, tag values specific to the entry (i.e., code name, company name), or information defined by the user. Identifiers may be used to distinguish each entry and are presented to the user for access and management purposes in a visual or audible manner. For example, display screens or verbal commands may

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the file has been removed from the main directory. The user would then access and activate a purge command to ultimately delete the items. In some circumstances, it may be advantageous to automatically delete the items without requiring any user interaction. Thereby, in an essence, the device is self-maintained in deleting expired entries. The user does not have to be "bothered" with the cumbersome task. Enabling the directory with an expiration field preprograms the management of the device, allowing minimal intervention from the user.

[0019] As noted above, devices may include transmitting capability between multiple devices. This is particularly advantageous for transferring and receiving multiple directory entries. For example, a person who changes jobs within a company may want to move a plurality of directory entries pertaining to a particular project from her directory to the directory of the person taking the her old job. Another example may have an individual copy his set of directory entries pertaining to his family members to a directory of a device of another family member. The organizational structure of the method as described herein may offer a manner in which to transfer and receive directory entries from one device to another. Once the entries have been selected, the user enters a destination telephone number and the destination device receives the transfer request. The directory system of a device that can receive and transfer directory entries can be of a similar structure of the device described above. In addition to the inclusion of a processor, storage medium, and output controller, a transitory medium exists to enable the transfer and receipt of entries. The transmitting capability also offers communication between a device and a database. For example, directory assistance is a database that is commonly used by customers of a telephone service provider. Other databases include a directory system within a computer network or a simple list of directory information. In the embodiments of accessing a database, the transfer of the entries is only in the direction of the database to the device by utilization of a destination telephone number. Alternatively, the directory entry may be downloaded to the device which activated the database, instead of entering in a destination telephone number. Alternatively, the entry may already exist in the directory of the device. Therefore, the program instructions executable by the processor initiate a search of all of the directory entries within the second device to search for any matching entry content values and then asks the user if the two entries are the same. If the user selects that they are the same, the processor executes program instructions to update the rest of the entry content values with the transferred entry.

[0020] The communications interface between the electronic communications device and the user of the method as described herein allows quick and easy accessibility and management of directory entries. The device may be programmed to present and receive information to and from the user. Presenting includes visual or audio presentations, whether the entries are presented on a display screen or by audible instructions. Receiving may include receiving a vocal command or a dual tone multi-frequency (DTMF) tone. In certain instances, devices are adapted to communicate with other electronic devices utilizing directory management systems. These communications include transmitting and a different form of receiving. Transmitting comprises automatically dialing a telephone number designated to another device or sending digital messages for the other device to present. The other form of receiving includes receiving transmitted information from the other device.

[0021] Directories as used in the applications recited herein refer to information databases within electronic organizational devices in which to store information regarding a particular individual, organization, or place. The information is programmed into the device by the user via a manual data-entering process or downloading the information via a transmitting signal. The directories are protected from modifications not authorized or programmed by the user, thus only allowing the user to manage and obtain access to the directory of the device. The structure of the directory entries within the method as described herein is adaptable to directory entry structures of other organizational devices in that information can be transferred in the same format.

[0022] Prior to the invention of the method as described herein, such multi-level organization data structures and directory management programs did not exist in directories within electronic communication devices. As society requires more and more tools to organize such matter, the need to create a directory with such organizational and management systems within an electronic communication device grows. There has also become a driving need to have portable organizational tools in which directory information can be readily available. The multi-level organizational data structure and directory management program within the system as described herein meets these demands and offers consumers alternative options with which to organize directories within their electronic communication devices.

[0023] The system and methods as described herein may offer several advantages over present organizational tools. They minimize the tedious, manual operations of maintaining directory entries and thus, aid in optimizing the efficiency of using a directory and the use of the device in which the directory is placed. The multi-level organizational data structure and directory management program allow the user of a device to quickly locate a given entry or multiple entries, in addition to managing multiple entries at once. In some instances, as discussed above, the user does not have to initiate the directory management program to update the directory entries within the device.

[0024] The system and method as described herein may allow the organization and management of a directory system within an electronic communications device in a concise and structured manner. Directory entries

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ganized into the directory set and further organized into subsets created within the directory set, including subsets within a multi-level organizational data structure. Thus, the directory set may contain multiple subsets. For example, directory 20 of Fig. 1 may be considered a set and sets 22 may be considered subsets along with subsets 24 created within them. Alternatively, such an organization may be viewed as multiple sets and subsets within the directory. A set could be viewed as a subset within the directory set or a set of one or more subsets. For example, Set 1 of Fig. 1 could be designated as Subset 1 of the Directory; while Subset 1A could be designated as a subset to Set 1. Set 1 and Subset 1 in this example thereby would be the same. Although the embodiment of Fig. 1 does not designate directory 20 as a set, such an interpretation may be used in all embodiments described herein.

[0029] Fig. 2 outlines a data structure in which directory entries are organized within a directory. In particular, directory entry Entry 1Ba from Fig. 1 is illustrated. Directory entries may be defined as a series of information relating to a person, place or thing. A directory is an information reference containing a collection of directory entries placed into an organizational structure. Directory entries within the data structure of Fig. 2 are labeled by identifiers 30, more specifically, set identifier 32, subset identifier 34 and entry identifier 36. The identifiers of Entry 1Ba (Set 1, Subset 1B and Entry 1Ba) as defined in Fig. 1 are placed into the corresponding categories of the data structure of Fig. 2. The second portion of the data structure organizes directory entries into fields 40 in which the specific entry content values 50 of the directory will be placed. Entry content values comprise the information which the directory entries contain. As shown in Fig. 2, entry content values may contain, but are not limited to, names, telephone numbers, mailing addresses, e-mail addresses, user defined information, or expiration criteria. User-defined information may include code names or information utilized by the user of the device, such as birth dates or gift ideas. Fields 40 contain field headings 41-46 referring to the type of information to be placed in the corresponding field. These field headings may be preprogrammed or user-defined. Other fields may be included in the data structure of Fig. 2, as indicated by the dashed lines following field heading 46 and the entry content value of expiration criteria. As with the number of possible layers within a directory, the data structure cited herein is not limited by the number of fields it can contain.

[0030] Turning now to Fig. 3, a flowchart is shown to illustrate the steps of selecting a directory entry, subset or set for further processing by a management command. It also shows how to present the entry content values associated with a selected directory entry to a user of an electronic communications device in which a directory is placed. Hereinafter, a device is defined as an electronic communications device in which a directory is placed and user will be defined as a person using a device. The process is started at step 60 of Fig. 3. Step 60 may be executed by a start command activated by the user or it may always be enabled, allowing the user to access the process at any time. More specifically, the task of simply supplying power to a device containing the cited directory system may activate step 60. Interconnects A and I at steps 95 and 280, respectively, join step 60 and are explained in further accompanying figures. The next step is process step 62 in which set, subset and entry identifiers are presented to the user. This first presentation is typically the identifiers corresponding to the sets and directory entries of the first layer of the directory organization data structure. For example, the layer in which Set 1, Set 2, Entry 3a, Entry 3b and Entry 3c consist in Fig. 1 would be presented. Alternatively, the presented layer of set, subset and entry identifiers may be of a different layer than of the first layer of the organizational data structure. This option may be preprogrammed by the user in order to increase the efficiency of the device. The identifiers may be presented in a variety of manners, including displaying characters on a display screen of the device or providing audible communication. Step 64 follows by receiving a selection of one or more of the presented set, subset or entry identifiers. The user of the device may make the selection by a variety of means, including using vocal commands, activating a device actuator, or supplying a pre-assigned dual tone multi-frequency (DTMF) tone. Either of the latter two options may utilize a screen on which the identifiers may be displayed and highlighted by the selection device.

[0031] The flowchart in Fig. 3 continues to step 66 in which the directory management program recognizes whether multiple identifiers have been received. In the case that multiple identifiers have been received, step 68 follows and determines if a management command has been executed. As will be discussed in Fig. 4, the directory management program may also be activated by first executing a management command and then selecting one or more entries, subsets, or sets to be managed. Interconnects A and B allow both process sequences. Step 90 leads the path of an executed management command via interconnect C, as will be discussed in Fig. 4 below. If a management command has not been executed at step 68, step 70 leads interconnect B to Fig. 4 to wait for a management command to be executed.

[0032] Referring back to step 66, the process route of the program turns to step 72 in the event that only one set, subset, or entry identifier is received in step 64. Step 72 determines whether a set or subset identifier has been received, in order to give the user the opportunity to select one or more directory entries or subsets within the set or subset associated with the selected identifier. In the event that only one entry identifier was received in step 64, step 74 would follow step 72. Again, the directory management program then determines if a management command has been executed. As in step 68,

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the directory management program in step 128. Then, step 129 follows to remove the entry content values and entry identifiers associated with the selected entries, subset, or sets. The removal process may either delete the entry or move it to a delete set, wherein the user may subsequently delete the file form the directory. Either option may be preprogrammed into the device or preselected by the user. The process is completed with a termination of step 80.

[0036] Turning now to Fig. 5, interconnect D at step 130 continues the process of managing directory entries, subsets and sets associated with selected identifiers if an add or delete command was not executed in Fig. 4. Step 140 follows step 130 to determine if an edit command has been executed. In the event that an edit command has been executed, step 142 follows to determine if a single entry, subset or set identifier has been received. Similar to step 122 of Fig. 4, if a single entry, subset or set identifier has not been received, the process follows step 95 of interconnect A to select an directory entry, subset or set to be modified. Alternatively, multiple identifiers may be selected. The edit process would then enable the user to modify an entry content value associated with multiple entries. This embodiment is not shown, but is inherent to the objective of the method as described herein, which is to present a method of organizing information within a directory and offering a method to manage the information within the organized structure. In the event that a single entry, subset or set has been selected, the process leads to step 144 to present entry content values or identifiers corresponding to the selected entries, subsets, or sets. In the alternative embodiment discussed in reference to Fig. 3, this step may already be complete and thus step 144 could be skipped.

[0037] Moving on to step 146, the program receives selection of an entry content value or identifier to be modified. Subsequent step 148 receives the modified entry content value or the modified identifier corresponding to the selected entry, subset, or set. Step 150 follows with the presentation of a prompt to the user to modify the selected entry, subset or set. As with step 126 of the delete command, subsequent step 152 either receives a confirmation command or rejection command. In the event that a rejection command is received, step 154 then reroutes the program back to step 144 to present the entry content values or identifiers of the selected entry, subset or set again. This allows the user to reselect an entry content value or identifier to be modified and reenter the modifications. Alternatively and as noted previously, the user may at any time choose to exit the directory management program by activating an exit command. If the user does decide to make the changes as originally entered in step 148, a confirmation command would be received in step 152 and thus, the selected entry content values or identifiers would be changed to the modified entries through step 156. The management process would then be completed by the termination of step 80. Alternate embodiments (not shown) may allow the user to return to step 144 after step 156 or any other step in the process in order to modify other entry content values or identifiers within the selected entries, subsets, or sets.

[0038] In the event that an add, delete or edit command has not been executed, the process outlined in Figs. 4 and 5 continues through interconnect E at step 160. Step 160 starts in Fig. 6 and leads to step 170, where the directory management program determines if a transfer command has been executed. As in step 122 of Fig. 4, the program determines if one or more entry, subset or set identifiers have been received at step 172. In the event that a selection has not been made, the program is routed through interconnect A at step 95 to go back to Fig. 3 to select one or more entries, subsets or sets to be transferred. However, if one or more identifiers have been received, step 172 leads to step 174 to present a prompt to the user to specify whether the directory entries corresponding to the selected identifiers will be transferred to an internal location within the directory of the device or to a directory within an external device. Step 176 follows, receiving an internal or external request to indicate whether the location is internal or external to the device. Step 178 determines whether an internal request has been received. If an internal request is not received, the process route continues to step 180, wherein a telephone number of an external device is received. The external device contains a directory in which the selected entries will be transferred. Step 182 follows wherein a descriptor is received for the selected entries. A calling signal is then transmitted to the external device in step 184. Subsequent step 186 transfers the selected entries to the received destination. Step 188 follows with a confirmation statement stating whether the selected entries were successfully transferred into the received destination. The process is completed by termination step 80.

[0039] The aforementioned transfer command may consist of either moving or copying one or more selected entries, subsets, or sets to a receiving destination. Moving is defined as removing the selected entries from the location in which they reside and transferring them to a receiving destination. Copying is defined as simply copying the selected entries and placing a copy in the receiving destination, so that the selected entries, subset, and sets are positioned in the original and new location. A device may be preprogrammed to perform either designated function automatically upon the activation of the transfer management command. Alternatively, the user may select to either copy or move the selected entries in an additional process step in Fig. 6 (not shown). For example, the additional step may be included after step 170 or step 176. And still another embodiment may substitute individual copy and move commands for the transfer command recited herein. More specifically, copy and move commands would be available to the user instead of a transfer command. Both of these com-

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entry from the directory upon expiration. The expiration criteria may comprise of a date or time, a tag value, an access frequency value, and an area code assigned to the vicinity in which the device containing the cited directory management program is located. A tag value is defined as a descriptor or symbol, in which to place one or more entries into a group not necessarily defined within a set or subset. For example, a user may be working with several individuals from different companies on a project. The individual could enter in the project name as the tag value and then delete all entries associated with the project once the project is complete. An access frequency value references the amount of times an individual entry has been accessed in a given time period. A user may enter an access frequency value as an expiration criterion of an entry so that once the access frequency falls below that value, the entry is removed from the directory. Expiration criteria may be entered into a directory upon creation of an entry or later as a modification to the entry. This data entry may follow the process outlined in Figs. 3-5 in which directory entries are selected, added, and edited. The benefit of establishing expiration criteria allows the directory to be relatively self-maintained. Unused or expired criteria may be deleted, thus allowing more storage capacity for other information.

[0045] Two means in which to remove expired entries from a directory containing a directory management program as cited herein are outlined in Figs. 8 and 9. Both means follow the same process steps except for the manner in which the expired entries are removed from the directory. Figure 8 illustrates the deletion of an expired entry, while Fig. 9 illustrates the transfer of an expired entry to a delete set where it is stored for further processing. Both situations start with step 60 and lead to step 300 wherein the expiration criteria within an individual directory entry is retrieved. The corresponding information value in the tracking medium is retrieved in subsequent step 302. The corresponding information values in the tracking medium relate to the current status of the device. As with the expiration criteria, the corresponding information values may track date or time, access frequencies, or the area code in which a device containing the cited directory management program is located. Step 304 follows by comparing the expiration criteria retrieved in step 300 to the information values received in step 302. Step 305 determines whether the values retrieved in steps 300 and 302 are the same. In the event that the values do not match, the process route is returned back to step 300 to retrieve expiration criteria from another directory entry. However in the case in which the values are the same, step 310 of Fig. 8 illustrates that the removal of the expired entry from the directory entirely. Step 320 in Fig. 9 moves the expired entry to a delete set for subsequent processing. The delete set referenced in Fig. 9 is the same delete set referenced in the previous discussion regarding the delete management command. In either embodiment the step following step 310 and 320 is step 300, wherein an expiration criteria of another directory entry is retrieved.

[0046] In the embodiment that a delete set is used for the removal of expired entries, the flowchart outlined in Fig. 10 may be used to illustrate the process of deleting the expired entries from the delete set. The process starts by executing a purge command in Figure 4 and through interconnect G, step 240 connects the management command to subsequent process steps. Step 242 follows by determining if a purge command has been executed. In the event that a purge command has not been executed, Figure 10 illustrates that additional management commands may be incorporated into the embodiment through interconnect H, step 250. However, if a purge command has been executed, step 244 is pursued to present identifiers associated with entries, subsets and sets stored within the delete set. Step 246 then determines if the device is set to remove all entries within the delete set at once. This setting may be pre-programmed into the device or it may be activated by the user within the programming instructions of the device. In the event that the device is set to remove all of the entries at once, step 248 follows by presenting a prompt to the user to remove all entries within the delete set. Either a confirmation command or a rejection command is received in step 260. Subsequent step 262 determines the process route of the program depending on the command received in step 260. If a rejection command has been received, step 262 will continue to interconnect I through step 280. Interconnect I may be followed back to Fig. 3 or Fig. 4 to select and transfer one or more entries from the delete set back to the directory of the device. In the event that a confirmation command is received in step 260, step 264 will follow by deleting all of the entries stored within the delete set followed by end step 80.

[0047] Turning back to step 246 of Fig. 10 wherein the device is not set to remove all of the entries within the delete set at once, step 266 follows by receiving selection of one or more entries, subsets, or sets within the delete set by the method as described in Fig. 3. A prompt is then presented to the user through step 268 to remove the directory entries associated with the selected identifiers. Step 270 receives either a confirmation or a rejection command, while step 272 determines the process route of the program by the command received. If a rejection command is received, interconnect I may then be followed through step 280 to either select alternative entries to be deleted from the delete set or transfer entries from the delete set back to the directory. In the event that a confirmation command is received in step 270, all entries associated with the selected identifiers will then be deleted in step 274. The process is completed by end step 80.

[0048] Fig. 11 presents a block diagram of directory system 400 within an electronic communications device. Input 410 activates preprogrammed commands to initiate processor 420 to execute program instructions

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munications device comprises a personal digital assistant.

5. The electronic communications device as recited in anyone of claim 1 to 4, wherein said update list is maintained by a telephone service provider.

6. The electronic communications device as recited in anyone of claim 1 to 5, wherein said update list is maintained by an entity other than a telephone service provider.

7. The electronic communications device as recited in anyone of claim 1 to 6, wherein said access comprises downloading the update list.

8. The electronic communications device as recited in anyone of claim 1 to 7, wherein the electronic communications device comprises:

a processor; and
a storage medium comprising a data structure, wherein said data structure comprises fields adapted for storage of said entry content values, wherein one or more of said fields comprise of one or more entry content values.

9. The electronic communications device as recited in claim 8, wherein said update list further comprises previously assigned directory values.

10. The electronic communications device as recited in claim 9, wherein the directory management program further comprises program instructions executable by the processor for receiving the update list.

11. The electronic communications device as recited in claim 10, wherein the directory management program further comprises program instructions executable by the processor for comparing said at least one or more entry content values with the said one or more previously assigned directory values.

12. The electronic communications device as recited in claim 10, wherein the directory management program further comprises program instructions executable by the processor for modifying the entry content values with the modified directory values of the update list upon matching at least one individual entry content value with the one or more previously assigned directory values.

13. The electronic communications device as recited in anyone of claim 1 to 12, wherein said entry content values comprise a name, a telephone number, a mailing address, or an e-mail address.

14. The electronic communications device as recited in claim 13, wherein the telephone number consists of a three-digit area code, a three-digit exchange code, and a four-digit individual-assignment code.

15. The electronic communications device as recited in anyone of claim 1 to 14, wherein the update list consists a register of old area codes, affected exchange codes, and new area codes.

16. A method of electronically updating directory entries within an electronic communications device directory, said method comprising:

activating an update command;

receiving an update list, wherein the update list comprises previously assigned directory values and modified directory values;

activating a confirmation command, wherein the confirmation command comprises comparing entry content values within said directory entries with the previously assigned directory values within the update list, and wherein the confirmation command further comprises modifying entry content values with modified directory values of the update list upon matching one or more entry content values with the one or more previously assigned directory values; and

discarding the update list.

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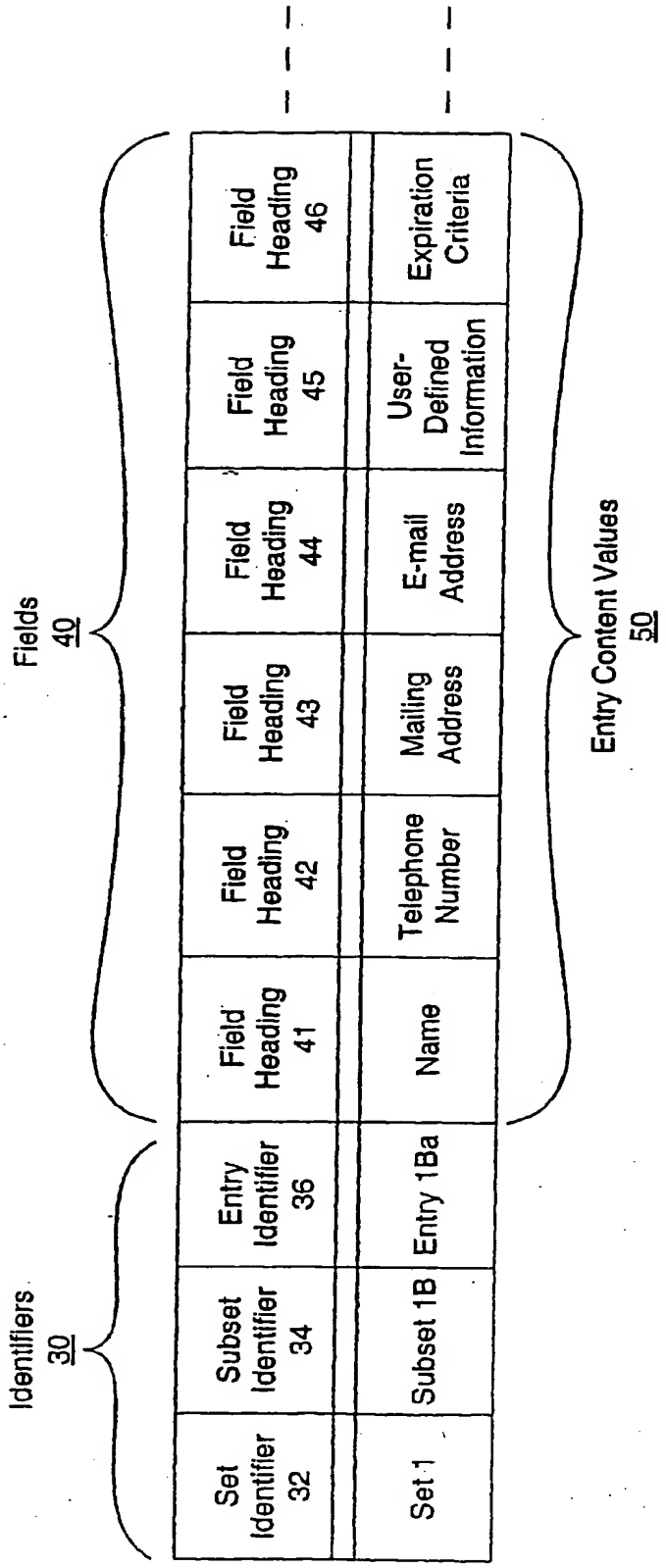

Figure 2

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Figure 4

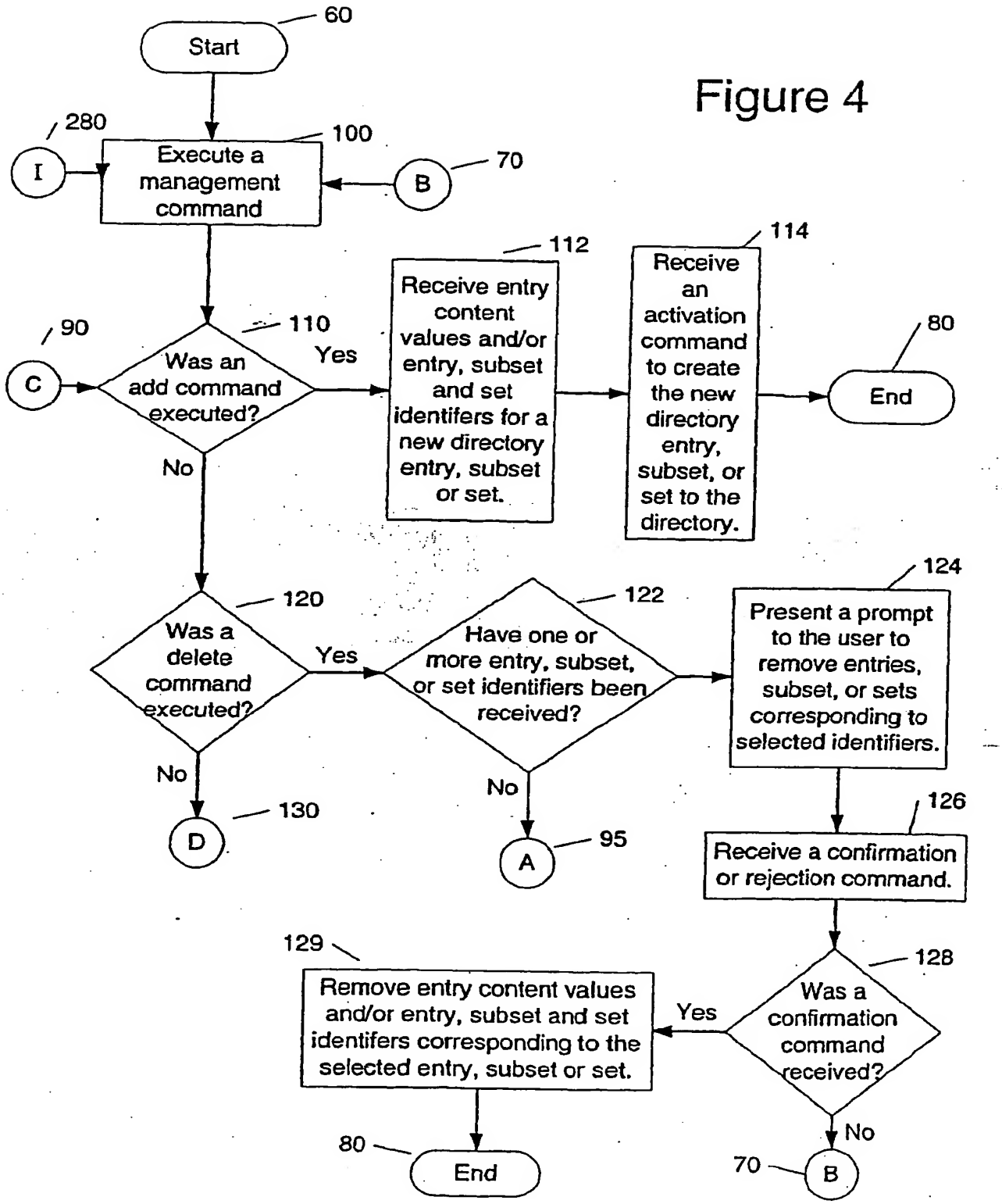

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Figure 6

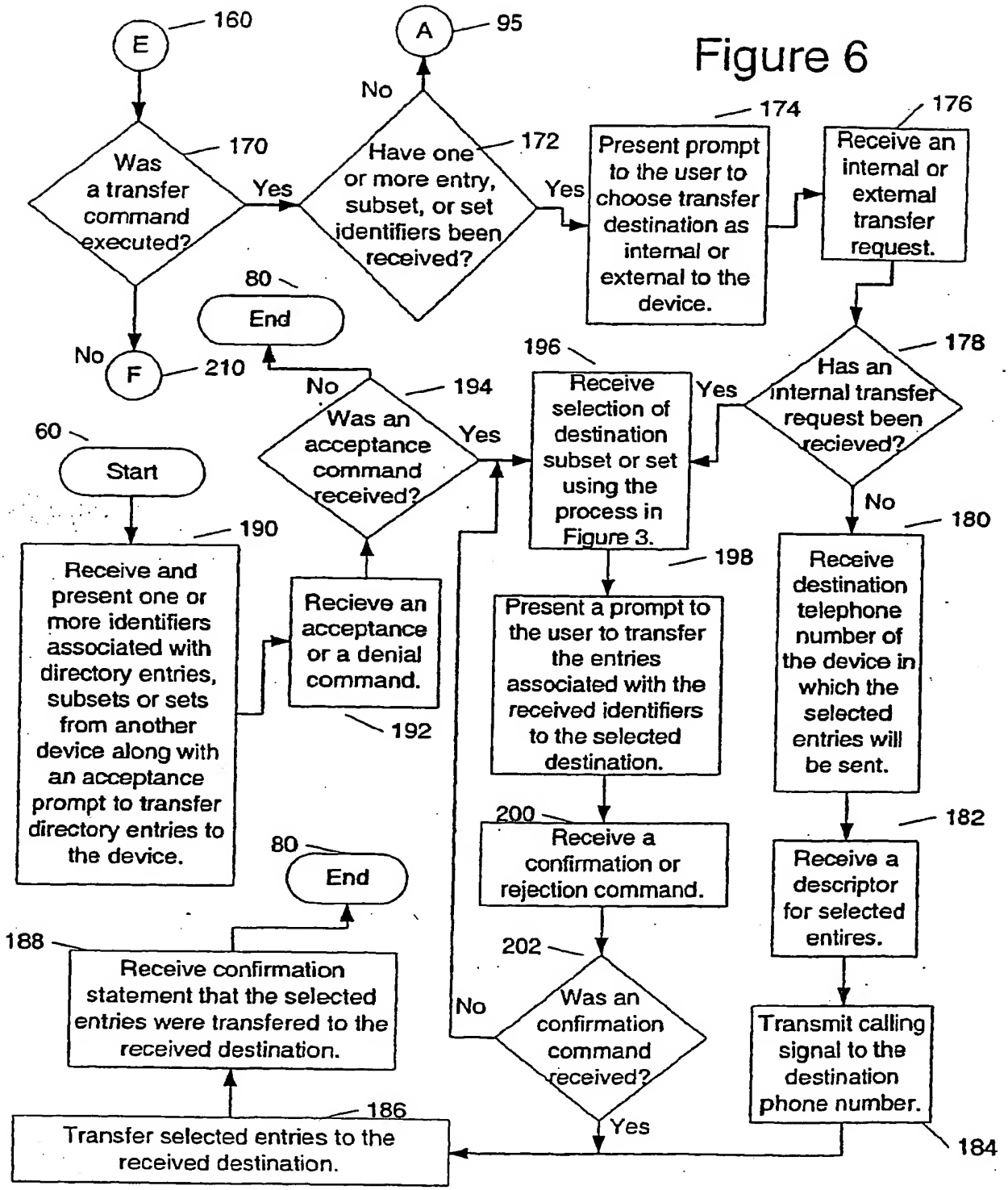

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Figure 8

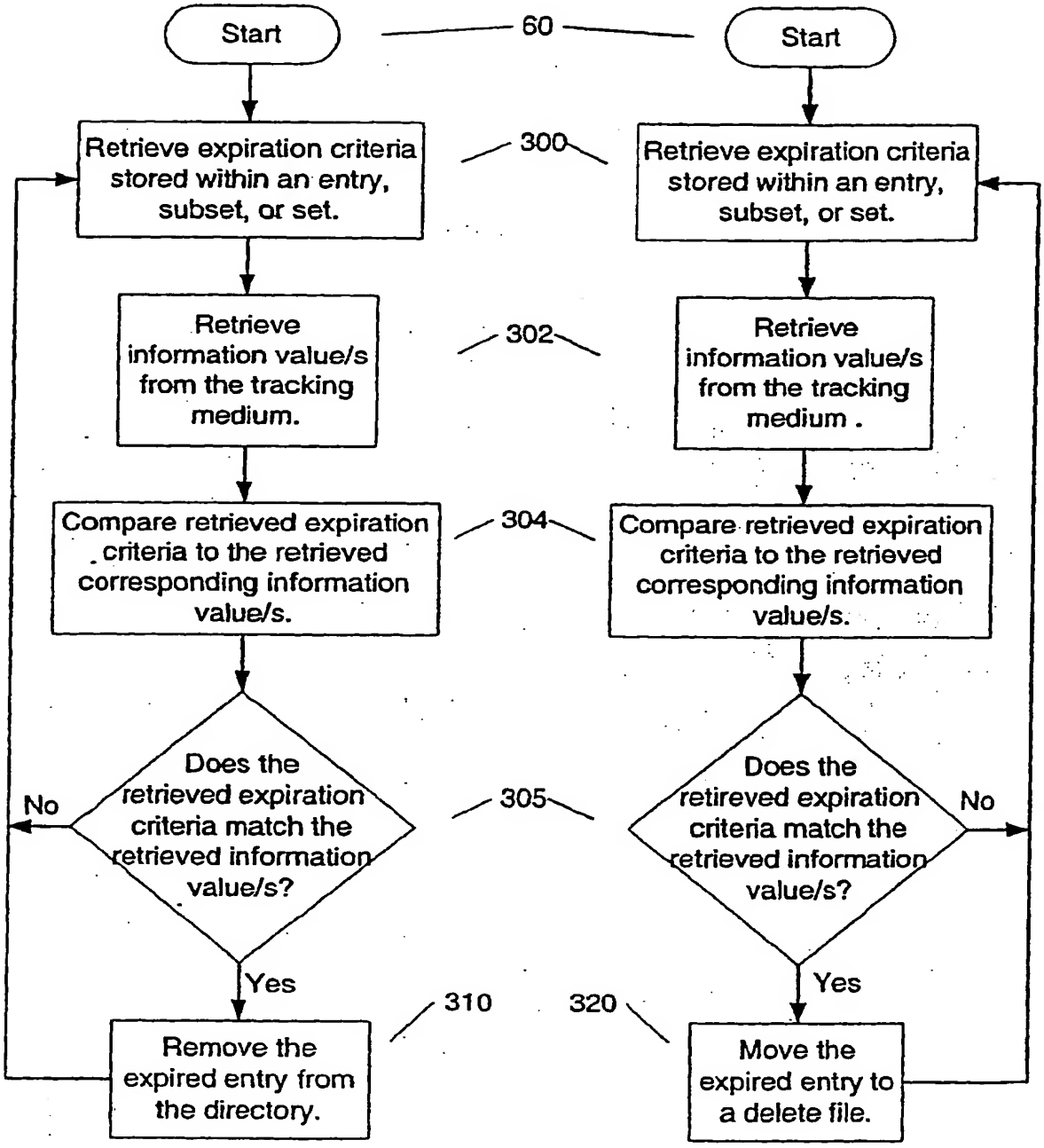

Figure 9

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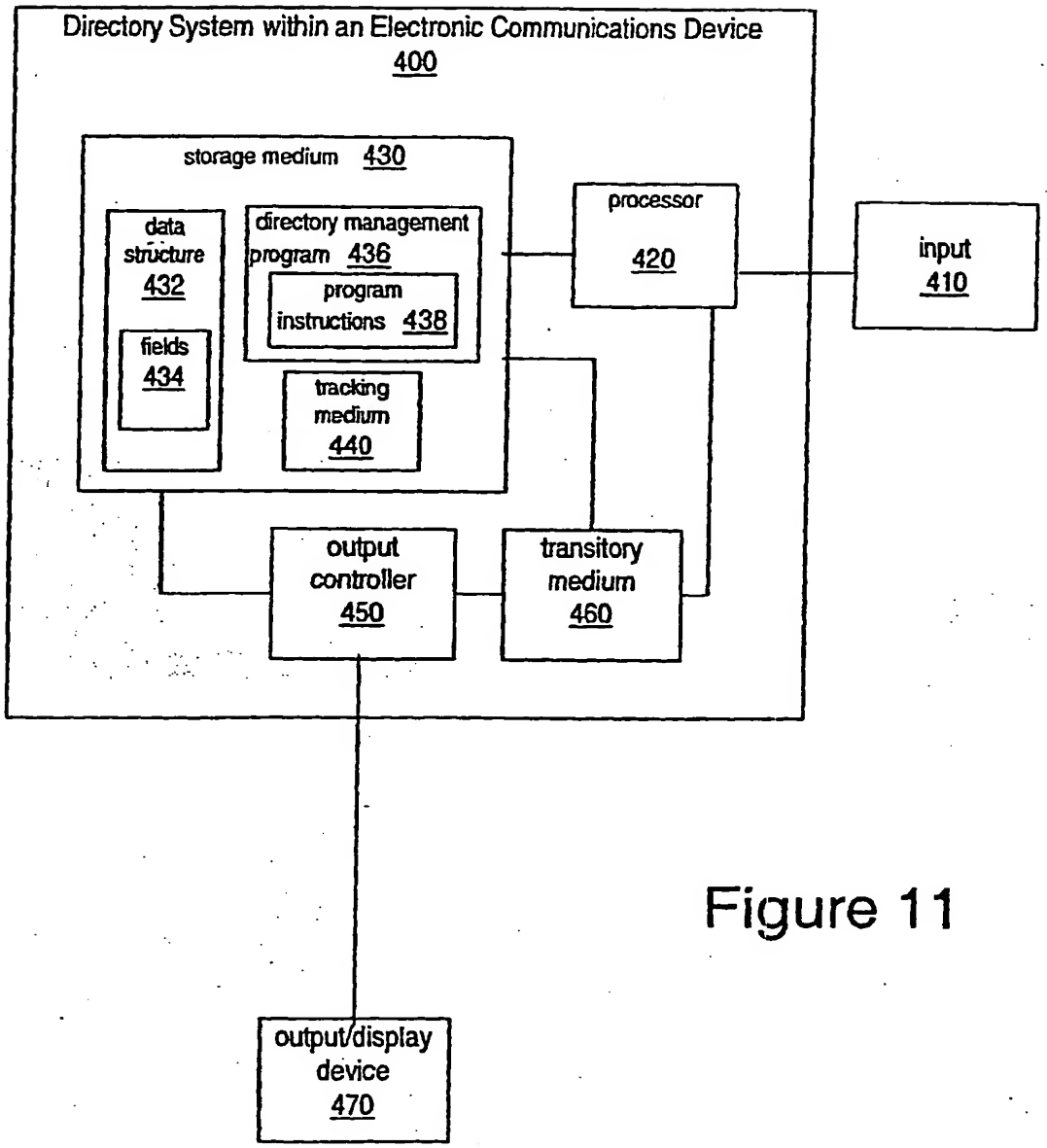

Figure 11

BNSDOCID: <EP___1189412A2_I_>

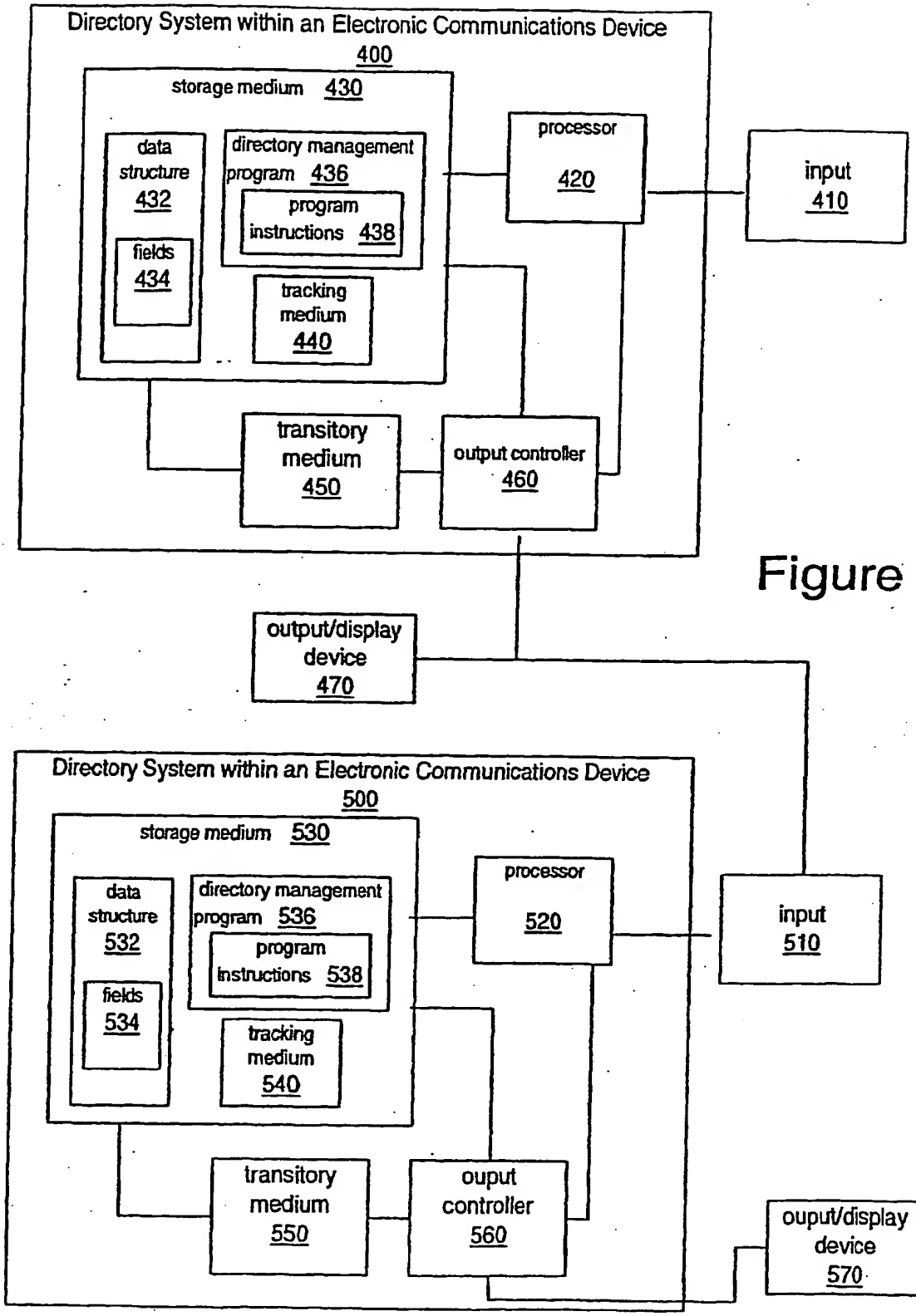

Figure 13

BNSDOCID: <EP___1189412A2_I_>